ORDER

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

6950.11A

14 March 1972

SUBJ: REDUCING ELECTRICAL POWER INTERRUPTIONS AT FAA FACILITIES

1. PURPOSE. This order is to establish agency policy and guidelines for:

   a. Identifying and eliminating or reducing potential hazard to the continuity of electrical power service at FAA facilities.

   b. Timely restoration of service when scheduled or unscheduled power interruptions occur.

2. DISTRIBUTION. This directive is distributed to the Division level in Airway Facilities Service, Systems Research and Development Service, Airports Service, Air Traffic Service and Flight Standards Service; to the Branch level in the Regional Airway Facilities Divisions; and to Airway Facilities, Air Traffic, and Airports field offices.

3. CANCELLATION. Order 6950.11 dated 8/21/70 is canceled.

4. BACKGROUND.

   a. Excessive facility outage time and preventable interruptions to electrical power service have occurred at many locations due to failure or mulfunction of electrical distribution systems, standby power equipment, power, and control cables. These failures have often been compounded by a lack of system familiarity of on-duty personnel. Other power interruptions and instances of unacceptable facility outage time have been caused by the unavailability of qualified technical maintenance personnel who could rapidly diagnose the cause of an electrical power failure and take quick corrective action to restore service. Some failures have been due to power system deficiencies not previously recognized or reported. Delays in restoration of power service have often been caused by lack of updated "as-built" drawings which correctly depict electrical distribution system, switching equipment, emergency power equipment, and cable routing associated with the affected facility. Other delays in restoration of service have been due to time involved for maintenance personnel to obtain keys to gain access to locked areas such as ARTCC engine generator buildings, power vaults, substations, etc. Other failures and service interruptions have been caused by construction crews accidentally cutting power or control cable to FAA facilities.

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Initiated By: SM-150

b. Facility outages and delays in restoration of power service caused by the problems outlined above can be minimized by properly trained competent on-duty technical maintenance personnel who are familiar with local electrical power systems. They must have the technical knowledge and capability to properly analyze and correct or prevent power system problems.

c. Elements of information in this order have been drawn from regional and Washington directives, national and regional evaluation reports. These directives and reports in addition to NASCOM reports emphasize the need for active preventive maintenance programs to minimize or prevent unscheduled service interruptions at FAA facilities.

5. APPLICATION. This order applies to:

a. Continuous maintenance coverage terminals.

b. Continuous power facilities.

c. Air Route Traffic Control Centers.

d. Other facilities authorized configuration A power.

6. RESPONSIBILITY. The area of responsibility for implementing this directive is divided between the regional Airports and Airway Facilities Divisions or their field counterparts.

a. The Airports Division has the responsibility to give agency recommendations concerning facilities installed and maintained by airport authorities in accordance with current agency policy.

b. The Airway Facilities Division has the responsibility to give recommendations concerning electric service which includes electrical distribution systems and alternate sources of power (either from a dual power source or a standby engine generator plant) provided to the agency by others to power agency maintained facilities.

c. Agency installed and maintained facilities are the responsibility of the Airway Facilities Divisions.

d. When current programs meet the objectives of this directive, additional coordination, new agreements, etc. are not required. However, extremely close coordination between the Airway Facilities Division and Airports Division personnel must take place to avoid duplication of effort.

7. IMPLEMENTATION. The designated representative as delegated by the region shall take the following actions. Where the regional office is directly involved in activities not delegated to the sector or other offices, such as contracting certain projects, entering into agreements with municipalities or military, the appropriate division in the regional office shall take the following actions.

a. Establish and maintain close liaison, mutual understandings and lines of communication between FAA, municipality, airport, military, and power company personnel at all levels that might be involved or provide assistance in cases of actual or potential power service interruptions.

b. Make prior arrangements for adequate notification from the power company, military, municipality, or airport officials on any construction, maintenance activities, or electrical power shortage that might adversely affect continuity of power service to FAA facilities.

c. Alert FAA construction crews responsible for excavating work to take adequate precautions to avoid accidentally cutting power or control cable.

d. Include in all applicable FAA issued contracts, information to alert contractors that any destruction of or damage to existing utilities or communication facilities, and other improvements whether above or below ground, shall be promptly repaired or replaced at the expense of the contractor at the direction of the contracting officer. The directions of the contracting officer may require complete replacement of conduits, pipes, wiring, cables, or similar improvements where original installation was made under a requirement for continuous unspliced lengths. The contracting officer has the right to have the necessary corrective work performed by the contractor at his expense, or by others and charge the cost thereof to the contractor. All contracts shall include requirements for positive marking (in accordance with FAA specifications) of all power and control cable runs installed per terms of individual contracts.

e. Promptly update "as-built" drawings showing locations of cable duct runs, manholes, transformers, switches, panels, building power circuits and all pertinent data when changes are made to electrical systems.

8. PROGRAM DEVELOPMENT. Programs developed in accordance with agency directives and general guidelines provided in this order should include as a minimum:

a. Written agreements and schedules with local airport authority, power company, military, or other responsible parties for the purpose of conducting emergency generator load tests and/or dual commercial power transfer equipment tests to ascertain that:

(1) The equipment is in good working condition.

(2) The quality of the prime and alternate source of power is acceptable for reliable operation of the facilities.

b. Participation by agency personnel in these tests with responsibility for noting system deficiencies, and initiating or recommending corrective action considered essential to the reliability of the power system. In the event that major deficiencies are noted, the agency representative will initiate appropriate action (NOTAMS, etc.).

c. Assurance that the installation, maintenance and operation of electrical systems and power generating equipment is equivalent to prescribed guidelines in current agency directives. The regional or sector offices may issue supplemental instructions to meet local requirements for improvement of electrical system reliability.

d. Maintenance coverage and restoration of FAA operational facilities listed in paragraph 5 shall be in conformance with agency policy and guidelines.

e. Establish a point of contact (power coordinator) in each power company that serve the facilities, and point-up the importance of ensuring uninterrupted operation of air traffic control, navigational and landing aids.

f. Arrange with serving power companies to advise a designated agency official (power coordinator) of developing electrical power shortages and request that intentional power cut-offs be coordinate with designated local point of contact in advance.

g. Assess the past and current performance of each standby E/G either maintained by FAA or others furnishing service to NAS facilities. Identify those that have an unsatisfactory record and take all possible action to improve it.

9. MAINTENANCE COVERAGE.

a. Each sector shall have at least one or more maintenance personnel on duty or on call-back response with the proficiency to correctly analyze the reason for an electrical power system failure and to take quick corrective action to restore power service to affected equipment or facilities.

b. The sector manager will assure that FAA personnel who are responsible for performing electrical system maintenance are, in addition to being qualified and competent, familiar and proficient with electrical power systems within their assigned area of responsibility.

c. At large facility complexes operated by municipalities or military service, it is expected that the responsible organization will have qualified personnel providing similar coverage. Individual organizations are responsible for the qualification of their personnel.

10. POWER SYSTEM TESTS.

a. The regional Airway Facilities Division shall schedule tests, monitor and evaluate the performance indicated by periodic testing under facility load of standby engine generator and/or dual commercial power transfer equipment maintained by FAA that supplies emergency power at facilities listed in paragraph 5. The Airports Division shall inform the sponsor of those tests expected of non-FAA equipment supplying services to FAA facilities.

b. Specific equipment and facility handbooks establish scheduled preventative maintenance tests and checks for engine generators and electrical power systems. The special inspections and "complete system performance tests" prescribed by this order are in addition to and do not alter existing daily, weekly, monthly, quarterly, semiannual, or annual inspections, tests and maintenance requirements prescribed by current agency handbooks and orders. The interval between the special performance tests and inspections required by this order shall not be greater than two years.

(1) Tests shall be thoroughly coordinated in advance with airport management, air traffic control and others directly concerned.

(2) The tests should be performed during periods of low activity and contingency plans should be available in the event that a major outage is created through test induced malfunctioning of some part of the system.

(3) Each test should be for a duration of not less than one hour except when an emergency condition develops which dictates its earlier termination.

(4) During the test period an adequate number of qualified observers (in each work specialty) shall be stationed at preselected locations for the purpose of identifying and recording significant events, deficiencies, etc. For example, standby engine generator rooms, electrical substations, key electronic facilities, etc.

(5) Watches of all observers should be synchronized and each observer should be equipped with a form on which to record chronologically significant events and the time of their occurrence.

(6) At the conclusion of the test, a critique should be held at a joint meeting attended by both operations and maintenance personnel, the results of the test reviewed, individual observer work sheets coordinated and collected and a summary report prepared. The sector manager or regional designated representative, will prepare the summary report.

(7) All significant events, deficiencies, etc., should be documented and reported to cognizant officials for whatever corrective action is indicated.

11. RESTORATION OF ELECTRICAL POWER SERVICE. The sector manager shall assure that essential data is developed and posted at appropriate locations (facilities, sector office, etc.) and that essential equipment is readily available which will expedite required action to restore service to facilities under his responsibility when power failure emergencies occur. All FAA personnel responsible for electrical systems mainteance shall review the posted data quarterly to maintain currency and proficiency. Following are typical examples of data, information and equipment essential to expedite restoration of electrical power.

a. FAA personnel who have the immediate hands-on responsibility for maintenance of electrical power systems shall have on their person, while on duty, keys to locked areas (FAA) which may be involved, such as ARTCC engine generator buildings, power vaults, substations, etc.

b. Names and availability of airport, municipality, military, or power company electrical systems maintenance personnel (24 hour coverage for emergency action) who are responsible for and familiar with their local electrical systems and switching equipment which involves FAA facilities. (Hands-on responsibility for electrical power restoration.).

c. Names and telephone numbers of FAA, airport, city, military, and power company supervisory personnel who may need to be contacted. Cover all hours of the day and night including weekends and holidays.

d. Post at appropriate locations a written set of precedural steps outlining the exact techniques to follow when power failure emergencies occur.

e. Appropriate safety instructions stating what know system deficiencies or peculiarities exist.

f. A power service schematic similar to that shown in Appendix 1, "One-line diagram of an Airport Distribution System."

g. Up-to-date facility "as-built" drawings. ("As-built" drawings shall have the location of all manholes, handholes, and splices accurately indicated.)

h. Storage location of FAA-owned portable and mobile engine generators including pertinent data, such as full load capacity, voltage regulation, etc.

i. Names of local firms, airports, military establishment, municipalities, etc., where portable or mobile engine generators can be obtained and the types of units that are available.

j. Essential load data of all facilities involved to determine capacities of portable and mobile engine generators when needed.

k. List of sources of fuel at all hours of the day night, including weekends and holidays. Also assure that on-site fuel supplies are maintained at the optimum level to sustain facility operation for the time required to verify engine operations and provide additional fuel.

l. Location and availability of spare cables and splice kits, including companies who can provde repair service and electrical or mechanical supplies on an emergency basis. Arrange for 24-hour service where reasonably possible.

12. INSPECTION OF ELECTRICAL POWER SYSTEMS.

a. The Airway Facilities Division will monitor and periodically participate in the sector or regional conducted inspection of electrical power systems to determine if deficiencies exist and if FAA equipment serving the facility is serviced and maintained in accordance with agency directives.

b. The Airports Division shall inform the sponsor that similar inspection by their personnel are expected of non-FAA equipment supplying services to FAA facilities. If current written agreements between the sponsor and Sector Manager, Airports Division, or Airway Facilities Division, meet the objectives of this order, additional agreements need not be obtained.

c. Check for the following as a minimum to ascertain that:

(1) Cables, circuit breakers, motor overload devices, transformers, and insulating oils are tested periodically.

(2) Circuit breakers and relays are properly adjusted and periodically exercised.

(3) Cable insulation tests are performed and results recorded at periods stipulated in handbooks and then analyzed for trends.

(4) Spare fuses are stocked at accessible locations.

(5) FAA switches, cutouts and panels in non-FAA owned vaults and sectionalizing pads are properly identified and maintained and provisions for adequate access provided for servicing by FAA personnel.

(6) Facilities dependent on one power or control cable, are properly identified and records of locations maintained.

(7) All interior splices not waterproofed are adequately identified.

(8) All cable runs on airports feeding NAVIDS and LIGHTING AIDS have positive marking. (Include sponsor, military and/or power company cable which supplies power to FAA equipment.)

(9) Safety working equipment such as hot sticks, high voltage linemen's gloves, rubber blankets, safety belts, etc. are available.

(10) The safety equipment listed above has been tested periodically, in accordance with the accident prevention handbook.

(11) Procedures covering action to be taken in case of commercial power failure are conspicuously posted at appropriate locations.

(12) The regions (as a minimum), should include the checks described above as part of their regular facility technical inspection program at all applicable locations.

C. W. WALKER
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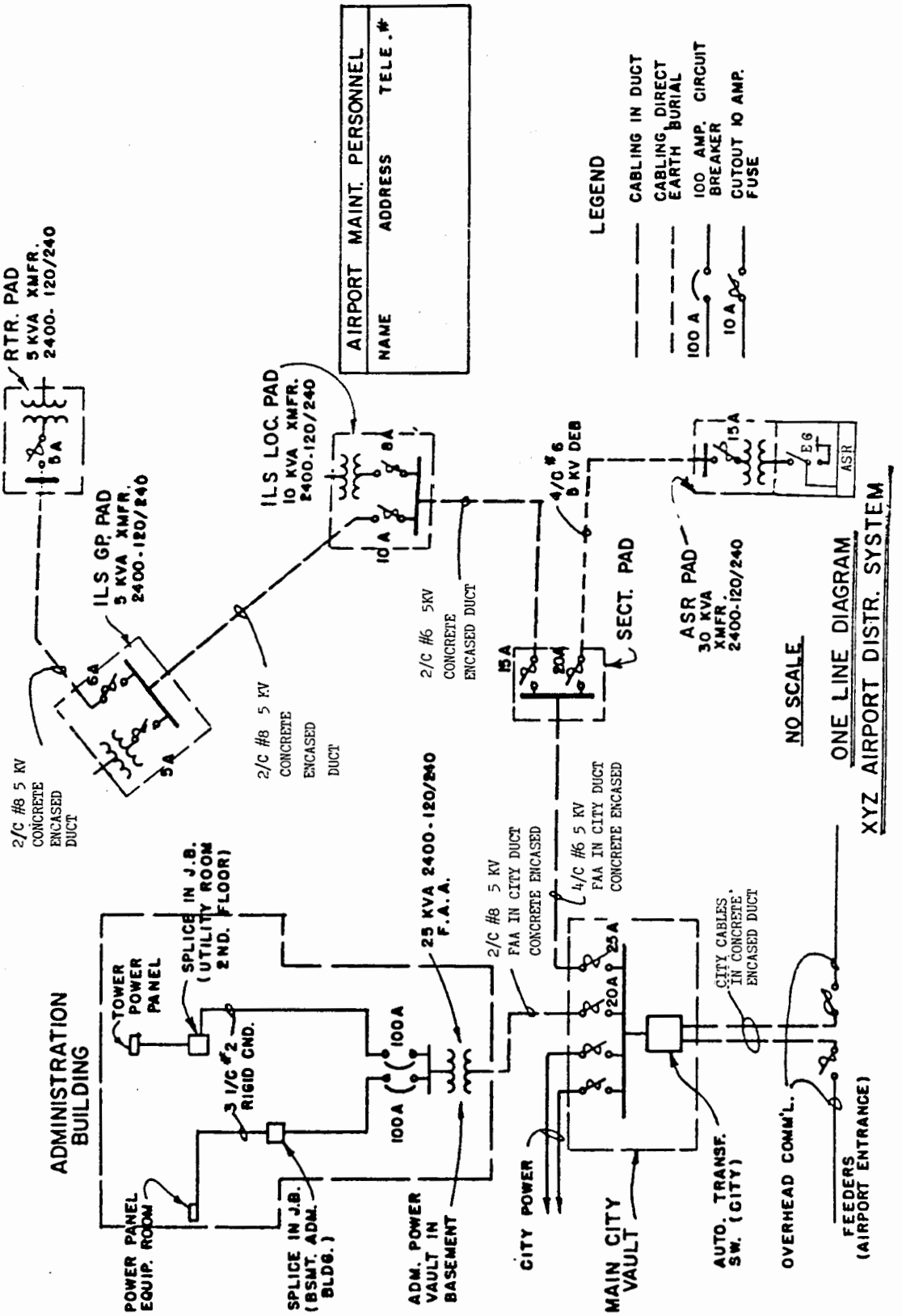
AIRPORT MAINT. PERSONNEL
NAME
ADDRESS
TELE.#
LEGEND
CABLING IN DUCT
CABLING DIRECT EARTH BURIAL
100 AMP. CIRCUIT BREAKER
CUTOUT 10 AMP. FUSE
RTR. PAD
5 KVA XMFR. 2400-120/240
ILS GP. PAD
5 KVA XMFR. 2400-120/240
ILS LOC. PAD
10 KVA XMFR. 2400-120/240
2/C #8 5 KV CONCRETE ENCASED DUCT
2/C #8 5 KV CONCRETE ENCASED DUCT
2/C #6 5KV CONCRETE ENCASED DUCT
4/0 #6 5 KV DEB
SECT. PAD
ASR PAD
30 KVA XMFR. 2400-120/240
ASR
ADMINISTRATION BUILDING
TOWER POWER PANEL
SPLICE IN J.B. (UTILITY ROOM 2ND. FLOOR)
3 1/C #2 RIGID CND.
100A
25 KVA 2400-120/240 F.A.A.
2/C #8 5 KV FAA IN CITY DUCT CONCRETE ENCASED
4/C #6 5 KV FAA IN CITY DUCT CONCRETE ENCASED
CITY CABLES IN CONCRETE ENCASED DUCT
POWER PANEL EQUIP. ROOM
SPLICE IN J.B. (BSMT. ADM. BLDG.)
ADM. POWER VAULT IN BASEMENT
CITY POWER
MAIN CITY VAULT
AUTO. TRANSF. SW. (CITY)
OVERHEAD COMM'L.
FEEDERS (AIRPORT ENTRANCE)
NO SCALE
ONE LINE DIAGRAM
XYZ AIRPORT DISTR. SYSTEM